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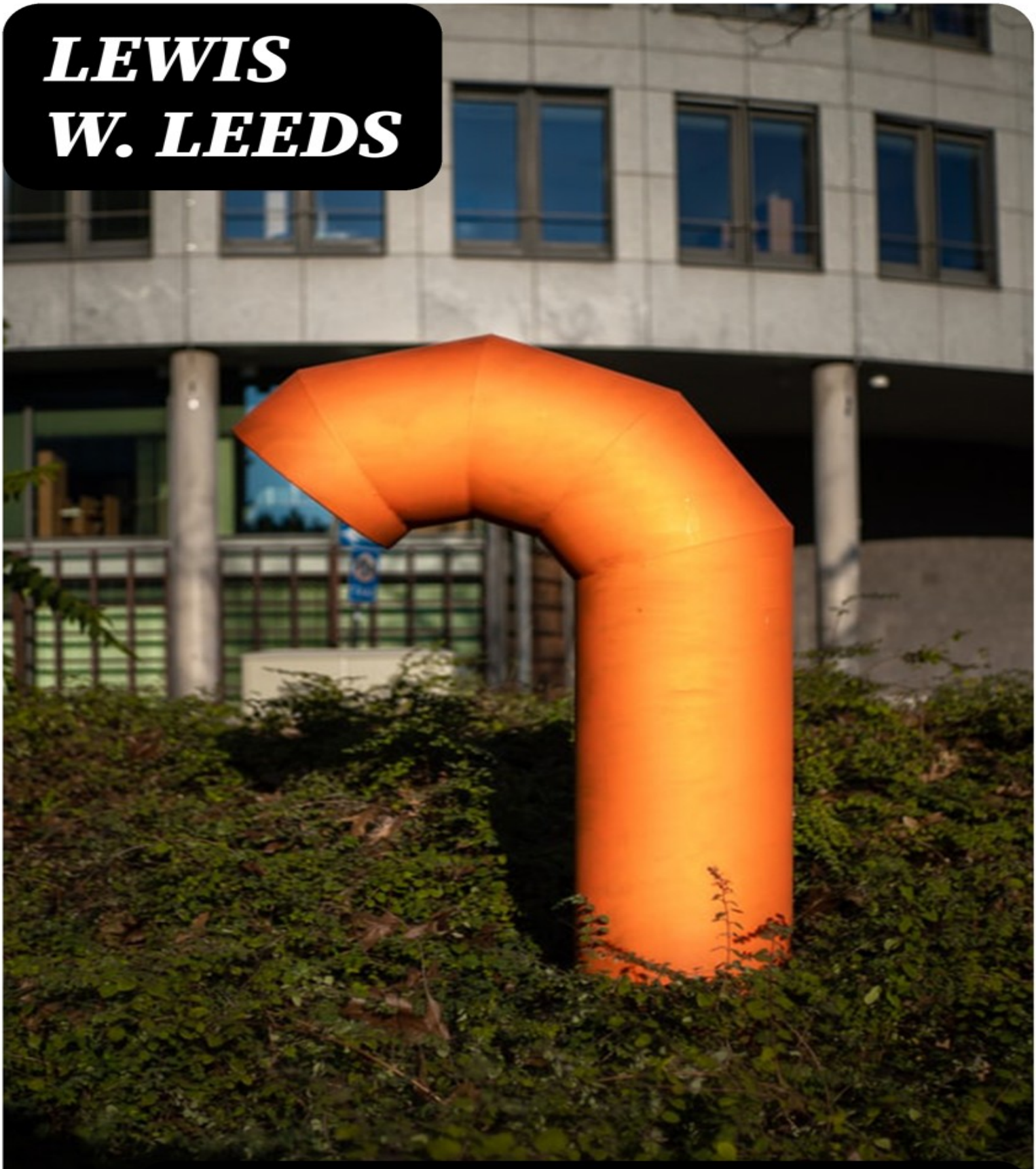

LECTURES ON VENTILATION

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Lectures on Ventilation

Being a Course Delivered in the Franklin Institute of Philadelphia

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Table of Contents

PREFACE.

Table of Contents

These Lectures were not originally written with any view to their publication; but as they were afterwards requested for publication in the Journal of the Franklin Institute, and there attracted very favorable notice, I believed the rapidly increasing interest in the subject of ventilation would enable the publishers to sell a sufficient number to pay the expense of their publication; and, if so, that this very spirit of inquiry which would lead to the perusal of even so small a work, might be one step forward towards that much-needed more general education on this important subject.

It was not my desire to give an elaborate treatise on the subject of ventilation. I believed a few general principles, illustrated in a familiar way, would be much more likely to be read; and, I hoped, would act as seed-grain in commencing the growth of an inquiry which, when once started in the right direction, would soon discover the condition of the air we breathe to be of so much importance that the investigation would be eagerly pursued.

L. W. L.

LECTURE I.

Table of Contents

Philadelphia is one of the healthiest cities in the United States, and, in proportion to the number of its inhabitants, few more healthy cities exist in the world.

This is not owing especially to its more salubrious situation, but should be attributed, in a great measure, to the accidental superiority of the ventilation of a large proportion of its dwelling-houses.

Notwithstanding this comparative excellence, the theory of ventilation is not so thoroughly understood, nor is the practice so perfect, even in this city, that no advantage can be gained by further knowledge upon the subject.

Far from it. From the very best information we can command, and with the most accurate statistics at our disposal, we are forced to the conclusion that about forty per cent. of all the deaths that are constantly occurring are due to the influence of foul air.

The Registrar of Records of New York gives nearly half the deaths in that city as resulting from this cause.

The deaths in this city for 1865, according to the report of the Board of Health, were seventeen thousand one hundred and sixty-nine; the average age of those who died was between twenty-three and twenty-four years. It ought to have been twice that, as shown by some districts in the city and also in the country, where the houses are so arranged that they frequently have good ventilation.

Taking the deaths caused by foul air at a very low estimate, say forty per cent. of the whole, (the per centage from that cause is not so great as in New York,) we have six thousand eight hundred and sixty-eight deaths in this city, caused alone by impure air, in one year.

It is estimated by physicians that there are from twenty-five to thirty days of sickness to every death occurring; there would therefore be something like two hundred thousand days of sickness annually as an effect of foul air.

We all know how very expensive sickness is, but few persons realize the enormous aggregate expense of unnecessary sickness in a city like Philadelphia. [1]

This subject has awakened much interest in Europe of late years, and has led to the expenditure of immense sums of money, for the purpose of improving the sanitary condition of its cities.

Dr. Hutchinson estimated the loss to the city of London, growing out of preventable deaths and sickness, at twenty millions of dollars annually, and Mr. Mansfield estimates the loss from this cause to the United Kingdom at two hundred and fifty millions of dollars.

In the single State of Massachusetts, an estimate exhibits an annual loss of over sixty millions of dollars by the premature death of persons over fifteen years of age.

It is estimated that a few only of the principal items of expense incurred by preventable sickness in the city of New York amount to over five millions of dollars annually.

And if it is thought that Philadelphia is exempt from such enormous unnecessary expense, just glance at the report of the Board of Health for last year, and see how the deaths

from disease of the lungs largely exceed those from any other disease.

Consumption is almost entirely the result of breathing impure air—it is as preventable by the exclusive use of pure air as *maniaa potuor* drunkenness is by the exclusive use of pure water. And see, too, what slaughter among the innocents—over twenty-five per cent. of the whole deaths were under one year of age.

The infantile mortality is by many considered the most delicate sanitary test. But why does such an intelligent community as this so neglect its own interest?

They have listened to and satisfied the first imperative demands of nature—shelter from the elements and warmth—and in doing this they have not brought into use that much higher order of intellect which can alone teach them how to supply, in connection with an agreeable warmth, an abundance of pure air in their otherwise air-tight houses.

I have been much interested in examining a large collection of tables of the analysis of air, which accompany a report to Congress, on "Warming and Ventilating the Capitol," prepared by Thomas U. Walter, Professor Henry and Dr. Wetherill. These tables were made by men of various nations, giving the results of their analysis of air taken from all manner of places, from great elevations on the mountains and in balloons, from the valleys, from the centre of the ocean, and from the middle of the continent, in cities and in the country, in winter and in summer, at night and in the day, and also the comparative analysis of the air *out of doors and in houses*. Believing that these would be of much interest and assistance to us in the investigation of the subject under consideration, I have had copies made of some of the most interesting.